List of Courses Focus on Employability/ Entrepreneurship/ Skill Development

Department : *Electronics and Communication Engineering*

Programme Name : *B.Tech.*

Academic Year : 2019-20

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	EC01TBS01	Mathematics-II
02.	EC01TBS02	Chemistry
03.	EC01TES01	Programming for Problem Solving
04.	EC01TES02	Engineering Mechanics
05.	EC01PBS01	Chemistry Lab
06.	EC01PES01	Programming for Problem Solving Lab
07.	EC01PES02	Workshop Manufacturing & Practices
08.	EC01PES03	Engineering Mechanics Lab
09.	EC01PMC01	Induction Training Programme
10.	EC02TBS03	Physics
11	EC02TES01	Basic Electrical Engineering
12	EC02TBS04	Mathematics-I
13	EC02THS01	English
14	EC02TMC01	Environment Sciences
15	EC02PBS02	Physics Lab
16	EC02PES04	Basic Electrical Engineering Lab
17	EC02PES05	Engineering Graphics & Design Lab
18	EC03TPC01	Electronic Devices
19	EC03TPC02	Digital System Design
20	EC03TPC03	Signals and Systems
21	EC03TPC04	Network Theory
22	EC03TBS05	Mathematics-III
23	EC03THS02	Engineering Economics
24	EC03TMC02	Constitution of India
25	EC03PPC01	Electronics Devices Lab
26	EC03PPC02	Digital System Design Lab

27	EC04TPC05	Analog and Digital Communication
28	EC04TPC06	Analog Circuits
29	EC04TPC07	Microcontrollers
30	EC04TBS06	Numerical Methods
31	EC04TES05	Electronics Measurement & Instrumentation
32	EC04THS03	Effective Technical Communication
33	EC04PPC03	Analog and Digital Communication Lab
34	EC04PPC04	Analog Circuits Lab
35	EC04PPC05	Microcontrollers Lab
36	EC5TPC07	Lic & Its Application
37	EC5TPC08	Communication System- II
38	EC5TPC09	Electromagnetic Field Theory
39	EC5TPE01	Microprocessor & Its Application
40	EC5TPE02	Data Structure & Operating System
41	EC5TOE11	Computer Architecture
42	EC5TOE12	OOP in C++
43	EC5TOE13	Introduction to Information Security
44	EC5TOE14	Project Management
45	EC5TOE15	Rural Technology and Community Development
46	EC5PPC07	LIC & ITS APPLICATION Lab
47	EC5PPE01	Microprocessor & Its Application Lab
48	EC5PPC08	Communication System -II Lab
49	EC6TPC10	Digital Signal Processing
50	EC6TPC11	Antenna & wave prapogation
51	EC6TPE03	Data Communication & Computer Networking
52	EC6TPE04	Fundamental of VLSI Design
53	EC6T0E21	UNIX, Operating System
54	EC6T0E22	Probability & Stochastic Process
55	EC6TOE23	Advanced Instrumentation
56	EC6T0E24	Knowledge management
57	EC6T0E25	Engineering System Design Optimization
58	EC6PPE02	VHDL Lab
59	EC6PPC06	Digital Signal Processing Lab
60	EC6PSP01	Seminar
61	EC7TPC12	Microwave Engineering

62	EC7TPC13	Wireless Mobile Communication
63	EC7TPE05	Advance Hardware Design
64	EC7TPE06	Power Electronics
65	EC7TOE31	Wireless Sensor Network
66	EC7TOE32	Information theory and coding
67	EC7TOE33	Nanotechnology
68	EC7TOE34	Optical instrumentation and measurement
69	EC7TOE35	Neural Network and Fuzzy Logic
70	EC7TPPC12	Microwave Engineering Lab
71	EC7TPPE05	Comprehensive Viva
72	EC7PSP02	Project-I
73	EC8TPC14	Radar and Satellite Engineering
74	EC8TPC15	Optical Fiber Communication
75	EC8TPE07	VLSI Fabrication Methodology
76	EC8TOE41	Basic building block of Microwave Engineering
77	EC8TOE42	Principle of Management
78	EC8TOE43	Mobile Computing
79	EC8TOE44	Embedded System
80	EC8TOE45	Advanced Power Electronics
81	EC8TPPC15	Optical Fiber Communication Lab
82	EC8TPPC16	Advanced RF and Microwave Design lab
83	EC8TPSP03	Project-II
84	EC8TPSP04	Comprehensive Viva
85	ET7100	Research Methodology in engineering
86	EC102	Vaccume Technology
87	EC103	Finite Element Method
88	EC104	Sensors Measurement Science & Technology
89	EC105	Artificial Intelligence
90	EC106	Optimization Techniques
91	EC107	Antenna for Modern Wireless Communication
92	EC108	Wireless and Computer Network

विभागाध्यक्ष (इले. एवं संचार अभियांत्रिकी)
H.O.D. (Elect. & Comm. Engineering)
प्रौद्योगिकी संस्थान
Institute of Technology
गु. घा. वि., बिलासपुर (छ.ग.)
G. G. V. Bilaspur (C.G.)

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC8TOE41	3			3 hours	40	60	3

Basic Building Blocks of Microwave Engineering

CourseObjective: Student will try to learn
1. Rectangular and circular wave guides using field theory.
2. The theoretical principles underlying microwave devices and networks.
3. To design microwave components such as power dividers, hybrid junctions, Directional Couplers, microwave filters, Microwave Wave-guides and Components, Ferrite Devices.
4. about Microwave Solid-State Microwave Devices and Microwave Tubes.
5. about Microwave Measurement Techniques.

Unit 1: Concept of Mode, TEM, TE, TM and Impedance concept. Loss associated with microwave transmission –Coaxial line, Rectangular waveguide, Circular waveguide, Planar transmission line.

Unit2: Challenges of Microwave design-Smith Chart (1st tool), Measurement f unknown impedances, Need of impedance matching at Microwave frequencies, Lumped element based impedance matching network by Smith Chart, Distributed impedance matching by Smith Chart, Broadband impedance matching network.

Unit 3: Voltage and current at microwave frequency, Scattering parameter (2nd tool) Properties of scattering parameter, Network analyser, Problem solving by equivalent voltage and current in waveguide and on scattering parameters.

Unit 4: Coaxial connectors, Microwave power divider and combiner, Microwave Resonators, Attenuators, Switching diode.

Unit 5: Microwave tubes, Microwave solid state diode oscillators, and Amplifiers, Microwave transistors

SUGGESTED BOOKS &REFERENCE:-

1. Microwave Engineering, David M Pozar,
2. Microwave Devices & Circuits, Samuel Y Liao,
3. Antenna Theory, C A Balanis

CourseOutcome : After completion of course, the student will be able to understand :
1. Integrating a wide range of Microwave components into one design oriented frame work
2. Design and solve real world problems
3. Characterize microwave devices in terms of the directionality of communication.
4. Use a microwave test bench in analyzing various types of microwave measurements.

ELECTRONICS & COMMUNICATION ENGINEERING — Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC8TOE42	3			3 hours	40	60	3

PRINCIPLE OF MANAGEMENT

CourseObjectives: Student will try to learn:

1.The functions and responsibilities of managers.
2. To provide them tools and techniques to be used in the performance of the managerial job.
3. To enable them to analyze and understand the environment of the organization.
4. To help the students to develop cognizance of the importance of management principles.

UNIT – I Management concepts, Nature, Scope, Significance, Function and Principle of Management Concepts.

Evolution of Management: Early Contribution, Taylor and Scientific management, Fayol's administrative management, Bureaucracy, Hawthrone Experiments and Human Relations.

UNIT – II

Planning- Concepts, Objectives, Goals, Components and Steps involved in planning process, MBO, Decision making process, Individual and Group Decision Making.

UNIT – III

Organizing- principles, Organization theories, Line & Staff Authority, Centralization, Decentralization, Delegation, Employee's empowerment, Span of control, Departmentation, Authority and Responsibility.

UNIT – IV

Staffing: Recruitment & Selection, Training & Development, Performance Appraisal Directing: Concept, Direction and Supervision, Co-ordination.

UNIT – V

Communication: Communication Process, Importance of Communication, Barriers to Communication, Controlling: nature, scope, functions, steps and process, control techniques.

SUGGESTED BOOKS & REFERENCE:

1. *Management, Stoner & Freeman, PHI*
2. *Principles of Management, Koontz, O'Donnell Wechrich, McGraw Hill*
3. *The Practice of Management, P F Drucker, Allied Pub*
4. *Essentials of Management, Massie, AITBS*
5. *Principles of Management, Terry and Franklin, AITBS*
6. *Organization and Management, R D Agarwal, TMH*

ELECTRONICS & COMMUNICATION ENGINEERING — Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC8TOE43	3			3 hours	40	60	3

MOBILE COMPUTING

CourseObjective: Studentwill try to learn:
1.About the concepts and principles of mobile computing;
2.To explore both theoretical and practical issues of mobile computing.
3. To develop skills of finding solutions and building software for mobile computing applications.

UNIT – I

Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, Hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

UNIT –II

Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications.

UNIT –III

Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.

UNIT –IV

Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.

UNIT –V

Ad Hoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

ELECTRONICS & COMMUNICATION ENGINEERING — Effective From 2018-19 (CBCS)

EC8TOE44	**3**			**3 hours**	**40**	**60**	**3**

EMBEDDED SYSTEMS

Course Objective: Student will try to learn:
The modern embedded systems and to show how to understand and program such systems using a concrete platform built around.

UNIT-I Embedded system Introduction : Basic idea on system, definition of embedded system, characteristic of Embedded system,. Challenges in designing of an embedded system, characterization of embedded system.
UNIT-II Components of Embedded system : Difference between microprocessor and microcontroller, Functional building blocks of Embedded systems, processor and controller, Memory, ports and communication devices.

UNIT-III Methodologies, Life cycle and Modeling: Software Life cycle, Embedded Life cycle Water Fall Model , Spiral Model, RAD Model and Modeling of Embedded system. Simulation and Emulation.

UNIT-IV Layers of an Embedded system: Introduction, Need for Layering , The Middleware Layer, The Application Layer. Introduction to Real Time Operating Systems.

UNIT-V Networks for Embedded Systems : Serial Communication RS 232 model, I square Model, CAN and CAN Open, SPI and SCI, USB, HDLC, Parallel Communication Basics PCI interface and PCI X- interface. Device Driver Serial Port and Parallel Port.

SUGGESTED BOOKS &REFERENCES: -

1. H.Kopetz, "Real-Time Systems", Kluwer, 1997.
2. R.Gupta, "Co-synthesis of Hardware and Software for Embedded Systems", Kluwer 1995.

CourseOutcome: After completion of the course student will be able to:

1. Identify the hardware and software components of an embedded system
2. Choose appropriate embedded system architecture for the given application
3. Write programs for optimized performance of an embedded system and validate

ELECTRONICS & COMMUNICATION ENGINEERING — Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC8TOE45	3			3 hours	40	60	3

Advanced Power Electronics

Course Objectives: Student will try to learn:

1.Selected areas of power electronics in greater depth.
2. Learn recent developments in power electronics.
3. in detail applications of power electronics

UNIT I Phase Controlled Rectifiers: Principle of phase control, Single Phase Full wave controlled converters: Midpoint and bridge type, analysis of two pulse bridge converter with continuous current., Single phase two pulse converters with discontinuous current

Unit-II
DC to DC switch mode Regulators: Introduction, Review of linear power supply and basic dc-dc voltage regulator configurations, Buck converters, Boost converters, Buck-Boost converters and their analysis for continuous and discontinuous conduction mode, other converter configurations.

Unit-III Resonant Converters: Introduction, Need of resonant converters, Classification of resonant converters, Load resonant converters, resonant switch converters, Zero Voltage Switching DC-DC Converters, Zero Current Switching DC-DC Converters, Applications Of Resonant Converters.

Unit-IV Multi-level converters: Need for multi-level inverters, Concept of multi-level, Topologies for multi-level: Diode Clamped, Cascaded H-bridge multilevel Converters configurations; Features and relative comparison of these configurations applications.

Unit-V Review of Inverters and Controllers: Review of single-phase half bridge, full bridge, bipolar, unipolar, VSI and CSI, review of single phase ac to ac controllers, Phase-Controlled Three-Phase AC Voltage Controllers.

Text Books:

1. Ned Mohan, Tore M. Undeland and William P. Robbins, "Power Electronics – Converters, Applications and Design", John Willey & sons, Inc., 3rd ed., 2003.
2. Muhammad H. Rashid, "Power Electronics - Circuits, Devices and Applications", Prentice Hall of India, 3rd ed., 2009.
3. Modern Power Electronics and AC Drives –B. K. Bose-Pearson Publications, 2002.
4. L. Umanand, "Power Electronics Essentials and Applications", Wiley India Ltd., 2009

REFERENCEBOOKS:-

RESEARCH METHODOLOGY IN ENGINEERING

SUB CODE	L	T	P	DURATION	ESE	CREDITS
ET7100	03	01	0	3 HRS	100	4

Introduction: Definition and objectives of Research — Types of research. Various Steps in Research process, Mathematical tools for analysis, developing a research question-Choice of a problem.

Literature review, Surveying, synthesizing, critical analysis, reading materials, reviewing, rethinking, critical evaluation. interpretation. Research Purposes, Ethics in rc.scarch APA Ethics code.

Quantitative Methods for problem solving: Statistical Modeling and Analysis. Time Series Analysis. Probability Distributions. Fundamentals of Statistical Analysis and Inference, Multivariate methods.

Concepts of Correlation and Regression_ Fundamentals of Time Series Analysis and Spectral Analysis, Error Analysis, Applications of Spectral Analysis.

Tabular and graphical description of data: Tables and graphs of frequency data of one variable. Tables and graphs that show the relationship between two variables Relation between frequency distributions and other graphs, preparing data for analysis.

Use of statistical sothvare,SPSS in research. Structure and Components of Research Report. Types of Report, Layout of Research Report, Mechanism of writing a research report, referencing in academic writing.

Reference Books

1. kothari, Research Methodology Methods and Techniques. 2/c, Vishwa Prakashan, 2006

2, Donald 1-1,McBum.cy, Research Methods, 5th Edition, Thomson Learning, ISEIN:31-3 L5- 0947-0, 2006

3, Donald R. Cooper, Pamela S. Schindler, Business Research Methods. &le, rata McGraw-Hill Co_ Ltd_ 2006.

Vacuum Technology

SUB CODE	L	T	P	DURATION	ESE	CREDITS
ECE 102	03	01	0	3 HRS	100	4

Unit-1: Fundamentals of Vacuum Technology: vacuum nomenclature and definitions, Gas properties, Molecular process and Kinetic theory, Throughput, Pumping speed, Evacuation rate. Outgassing rate, Leak rate, Gas How, Conductance, Flow calculations.

Unit-2: Vacuum generation: Diaphragm pump, Rotary pump. Diffusion pump, Cryogenic pump, Turbomotecular pump, Sputter-ion pump and Getter pumps

Unit-3: Vacuum Measurement scale, Gauges and Leak detection: U.H.V. techniques, Mass Spectrometer.

Unit-4: Surface Physics and its Relation to Vacuum Science: Adsorptions, Chemisorptions, Isotherms, Desorptions and Photoactivation.

Unit-5: Materials for Vacuum tubes, Chemical and Thermal Cleaning. Sputtering Techniques. Brazing. Spot, Arc, Electron beam and Laser weldings. Vacuum and Protected Atmosphere Furnaces. Jigs and Tools Processing of Electron-Beam Devices.

References:

Vacuum Science and Technology, V V Rao, T B Ghosh, K L Chopra 2.
Vacuum Journal, Science direct. Elsevier Publication
. Journal of Vacuum Science and Technology A, IEEE Transaction 4.
Journal of Vacuum Science and Technology B, IEEE Transaction

FINITE ELEMENT METHOD

SUB CODE	L	T	P	DURATION	ESE	CREDITS
ECE 103	03	01	0	4 HRS	100	4

Historical background, Basic concept of the Finite Element Method. Basic equationN in el asticity, Elemental shapes, nodes, nodal unknowns and coordinate systems, A general prz.)eedure for Finite Element Analysis, Application to the continuum, Discretization of the domain, Governing equations for continuum. Pre-processor. Processer and Post processor.

Basic concept of interpolation functions. Shape function in one, two and three dimension. Finding of shape function by Polynomial, Lagrange polynomial, Serendipity family and Hermite polynomial, Construction ofshape function by degrading technique.

Strain displacement and elemental stillness matrix, Assembling stillness equation, bctindaay conditions and solution, Spring and bar elements. Direct approach. Strain energy, Castigliano's first theorem, Minimum potential energy, Gaferkin's method. and Variational method, Isoparametric formulations.

Finite Element Analysis. liars, Beams Trusses and Rigid frame, Plates and shells, Heat transfer, Fluid and solid mechanics, Introduction to non-linear Finite Element rylcihods, Adaptive finite analysis, Automatic mesh generation. Choice of new mesh. Transfer variables,

Reference Books

1. Rao S.S., "The Finite Element Method in Engineering", Elsevier Se ience & TeehnDlogSi.
2. Hutton D,V., "Fundiamental of Finite Element Analysis", McGraw Hills.
3. Cook R.D., Malkus, D.S. and Plesha, M,E, "Concepts and Applications of Finite Element Analysis", 3 rd Ed,, John Wiley *et* Sons.
4. Bathe K.J., "Finite Element Procedures", Prentice I tall of India, New Delhi.
5. **Huebner** and Thorton, EA., "The Finite Element Methods for Engineers" John Wiley & Sons,
6. Zienewiccz 0.C. and Taylor, RI., The Finite Element Methods", Vol. I, Vol. 2 and Flo 1.3, McGraw Hill.
7. Belytshko, T., Liu, W.K. and Moran, B.. Non-linear Finite Elements for Continua and Structures", McGraw Hills.

Sensors & Measurement Science and Technology

SUB CODE	L	T	P	DURATION	ESE	CREDITS
ECE 104	03	01	0	3 HRS	100	4

Unit.1: Generalized Configurations and Functional Descriptions of Measuring Instruments: Functional elements Transducers, Analog and Digital modes of operation, Input-Output configuration of Instruments and Measurement systems, Static and Dynamic Characteristics of Instruments, Static calibration.

Unit-2: Motion Sensor and Measurement Fundamental Standards, Relative Displacements-Translational & Rotational, Relative Velocity, Relative Acceleration Measurements, Seismic Displacement Pickups, Seismic Velocity Pickups, Seismic Acceleration Pickups,

Unit-3: Force, Torque and Power Measuremeni• Methods of Force Measurement, Elastic Force Transducers, Torque Measurement on Rotating Shafts, Shaft Power Measurement, Vibrating. WireForce Trahsducers.

Unit-4; Pressure Measurement: Methods of Pressure Measurements, Deadweight Gages, Manometers, Elastic Transducers, Vibrating Cylinder and other Resonant Transducers, Dynamic Testing of Pressure measuring Systems, High and Low Pressure Measurement systems.

Unit-5: Temperature Measurements: Standards and Calibration, Thermal-Expansion Methods, Thermoelectric Sensors, Electrical-Resistance Sensors, Junction Semiconductor Sensors, Digital Thermometers, Radiation Methods.

References:

1. Measurement Systems, E Doebelin, D N Manik, McGraw Hill Publication
2. Sensor Technology Handbook, Jon S Wilson, Elsevier, 2004, ISBN-10: 0750677295
3. Journal of Sensors and Actuators, Science direct, Elsevier Publication
4. Journal of Sensors and Actuators A:Physical, Science direct, Elsevier Publication,

Artificial Intelligence

SUB CODE	L	T	P	DURATION	ESE	CREDITS
ECE 105	03	01	0	3 HRS	100	4

Unit-1: Definition of Al, Brie(history of Al, General problem Solving Approaches in Al-Learning Systems, Knowledge representation and reasoning, Planning, Knowledge Acquisition, Intelligence search, Logic Programming, Sort computing, Applications of Al techniques, Characteristic requirement for the realization of intelligent system. Programming languages for Al. Architecture for Al machine.

Unit-2: Cognitive perspective of pattern recognition- Template Matching, Prototype matching. feature based approach, Computational approach; Cognitive models of memoryAtkinson-Shiffrin's model, Tuiving's model, Parallel distributed processing approach: Underslariding of problem; Cybernetic view to cognition_

Unit-3: Production rules, Working memory, Control Unit/Interpreter, Conflict Resolution strategies, Types of production systems-Commutalive Production system, Decomposable Production system, Forward verses Backward reasoning, Merits of a Production system-Isolation of knowledge and control strategy, Direct Mapping onto State-space, Modular Structure of Production rules, Knowledge base Optimization in production system

Unit-4: Production Solving by Intelligent Search General problem solving approaches-Breadth first search, depth first search. Iterative deepening search, Hill Climbing; Simulated annealing; Heuristic Search- for OR Graph, Iterative deepening algorithm, AND-OR Graph, Adversary Search- MINIMAX algorithm, Alpha-Beta heuristics,

Unit•5: Logic of Propositions and Predicates- Formal definition. Propositional Logic-Semantic method for Ilworern proving. Syntactic method for theorem proving, Resolution in Propositional Logic, Predicate Logic. Unification of Predicates, Robinson's Interference Rule, Types of Resolution, Soundness and Completeness of Logic,

References:

1, Artifival Intelligence and Soft Computing, Amil Konar
2. Journal of Artificial Intelligence, ScienceDirect, Elsevier Publication 3, IEEE Transaction on Computational Intelligence and Al

OPTIMIZATION TECHNIQUES

SUB CODE	L	T	P	DURATION	ESE	CREDITS
ECE 106	03	01	0	3 HRS	100	4

Objective: Aims to teach various optimization techniques for wireless communication and antenna design.

Outcome.. Understand the fundamental optimization techniques in wireless communication for real time application.

Unit **I: Introduction Linear Programming**

Linear Programming: Graphical method, simplex method, Non-Simplex Method, revised simplex method, Big-ICI method. 2- phase method, alternate optimal solutions, unbounded LPs, degeneracy and convergence, duality in linear programming. sensitivity analysis. dual simplex **method,**

Unit II: Non-Linear Programming

Non-Linear Programming: Nonlinear Programming - Elimination methods, Interpolation methods, unconstrained optimization techniques - Direct search methods - Indirect search methods. Constrained Optimization methods — Direct methods. Indirect methods.

Unit in: Dynamic Programming

Dynamic Programming Multistage decision process. Concept (Asa optimization and principle of optimality, computational procedure in dynamic programming

Unit IV: Optimization Methods

Simulated annealing, Particle Swarm optimization, Ant colony optimization, Bee colony optimization. Bat Algorithms, Firefly Algorithms.

Unit V: Advanced Topics ill Optimization

Advanced Topics in Optimization for wireless communication and antenna design.

References Hooks:

1, Singiresu S Rao, "Engineering Optimization: rliory and Practice", 4th Edition, John Wiley and Sons.. 2009

2. **K. Deb,"Optimization for Engineering DesignAlgorithms and Examples",Prentice-Hall of India Pvt. Ltd., New Delhi, 1g95.**

3, Edwin K **P Chong** and Stanislaw S Zak, An Introduction to Optimization", Fourth Edition. John Wiley and Sons, 2013

4_55. Rao,"Engineering **Optimization:** Theory **and practice", New Age International Pvt. nLtd., New Delhi,. 2000.**

ANTENNAS FOR MODERN WIRELESS COMMUNICATION

SUB CODE	L	T	P	DURATION	ESE	CREDITS
ECE 107	03	01	0	3 HRS	100	4

Unit 1: Concepts of Radiation and Antenna Fundamentals

Fundamental parameters of antennas. Near and Far Field regions, S Parameters, Antenna Measurements: Radiation pattern, gain, directivity, phase and polarization measurement

Unit 2: Printed Antenna

Microstrip Antennas & Dielectric Resonator Antenna: Radiation mechanism - parameters and applications - feeding methods.

UNIT 3: Recontigurahle Antenna

Reconfigurable methodologies, Design Considerations for Reconfigurable systems', Reconfigurable Planar/printed antenna configurations. Active reconfigurable systems. Concept of Smart Antenna,

Unit 4: Array. of Antennas

Linear and planar array fundamentals, Mutual Coupling in Arrays. Multidimensional Arrays, Phased Arrays, Array Feeding Techniques. Array optimization techniques.

Unit 5 : MIMO System

Concept of MIMO Types of MIMO Systems Design Parameters of MIMO system.

Reference Books:

1. Jordan E C and Bahl-lain K G, "Electromagnetic Waves and Radiating Systems", 2nd Edition, PL:arson Education.
2. Balanis C A, "Antenna Theory: Analysis and Design". 4th Edition, John Wiley and Sons, New Jersey, 2016.
3. Kraus J D and ;Viarhefka R J, "Antennas for All Applications", 3rd Edition, Tata McGraw Hill, 2001.
4. Girish Kumar and Ray K P. "Broadband Microstrip Antennas", Artech House, 2003.

Wireless Communication & Network

SUB CODE	L	T	P	DURATION	ESE	CREDITS
ECE 108	03	01	0	3 HRS	100	4

Module 1: Overview of wireless communication, cellular communication, different generations of cellular communication system, satellite Communication including, wireless local loop, cordless phone,

Module 2: Recent wireless technologies: multicarrier modulation, OFDM, MIMO system, diversity-multiplexing trade-off, MIMO-OPOM system, smart-antenna; beamforming and MIMO, cognitive radio,

Module 3: Multiple access techniques in wireless communication: contention-free multiple access schemes (FDMA TDMA, CDMA, SDMA and Hybrid), contention-based multiple access schemes (ALOHA and CSMA).

Module 4: Wireless personal area networks (Bluetooth, UW(3 and ZigBee), wireless local area networks (IEEE 802.11, network architecture, medium access methods, WLAN standards

Module 5: Ad-hoc wireless networks: Design Challenges in Ad-hoc wireless networks, concept of cross layer design, security in wireless networks MANET and WS.N. Wireless system protocols.

Books recommended:

Textbooks: 1. Andrea Goldsmith, "Wireless Communications", Cambridge University Press, 2005.7, Sanjay Kumar, "Wireless Communication the Fundamental and Advanced Concepts" River Publishers, Denmark, 2015 (Indian reprint).

Reference books: 1. Vijay K Garg, "Wireless Communications and Networks", Morgan Kaufmann Publishers an Imprint of Elsevier, USA 2009 (Indian reprint) 2...1. Schiller, "Mobile Communication" 2/e, Pearson Education, 2012. Iti Saha rvilisra, "Wireless Communication and Networks: 3G and Beyond", 2/e, McGraw Hill (India) Private Ltd, New Delhi, 2013